

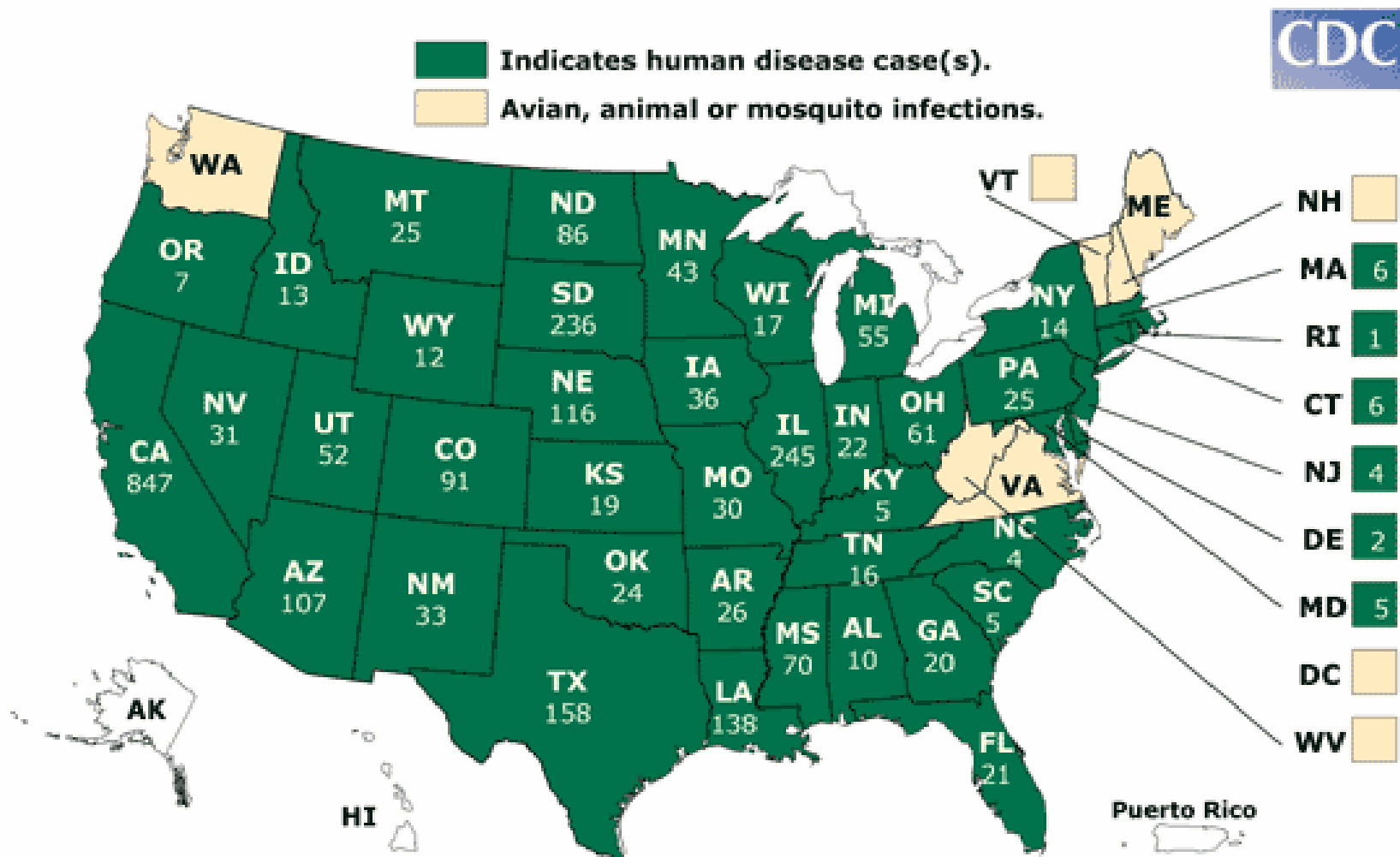
# **West Nile Virus Human Case Surveillance**

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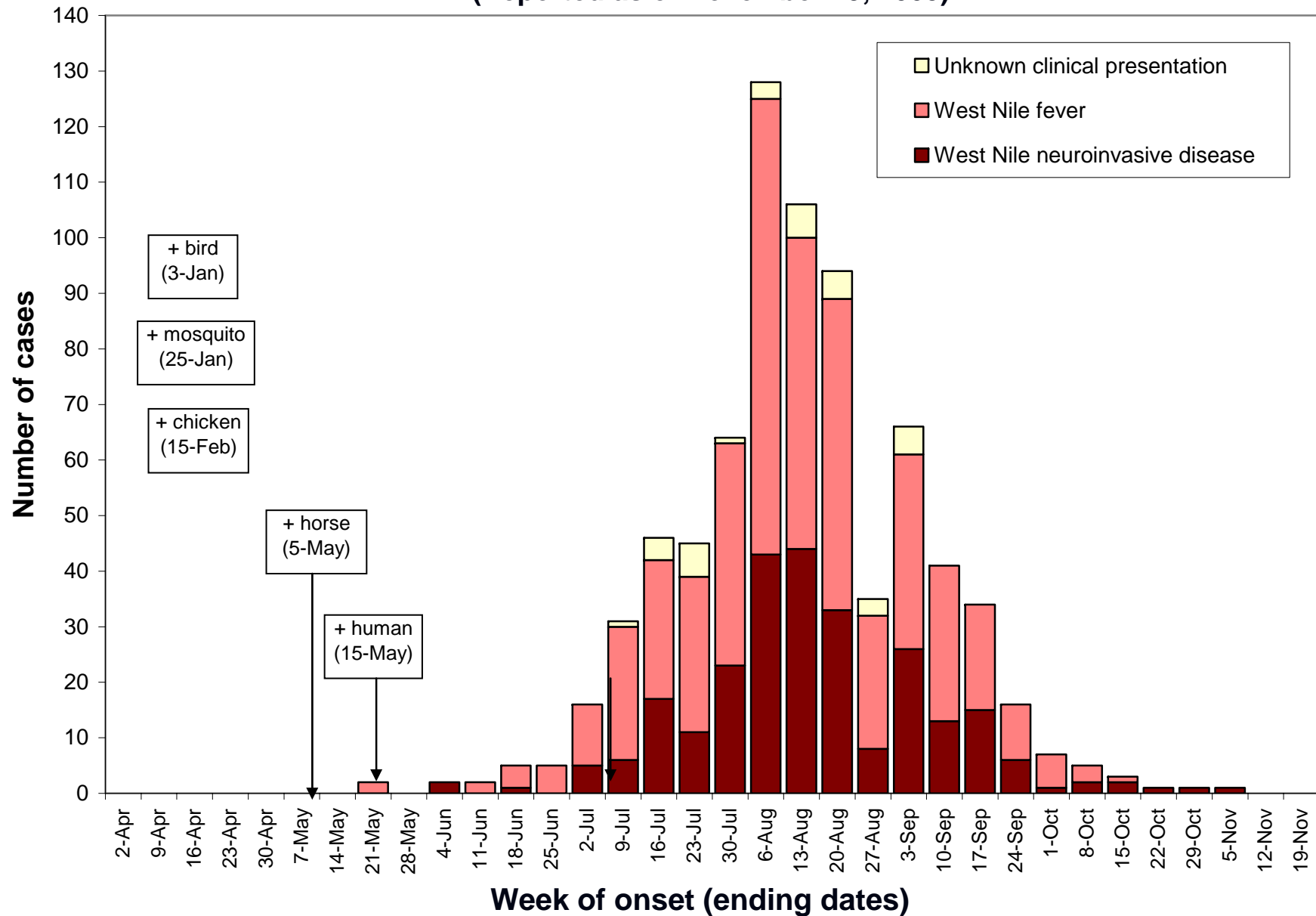
WNV Prevention, Surveillance, and Control Workshop  
December 8, 2005

# **Summary of Human WNV Activity California, 2005**

# Human WNV cases in the U.S., 2005

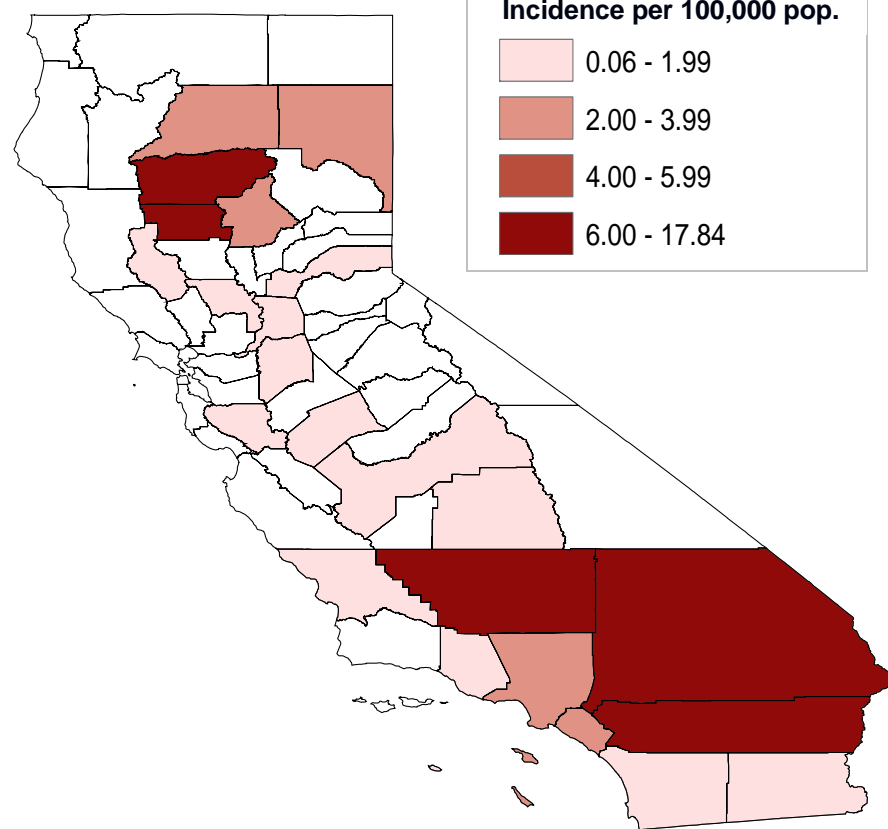


# Human West Nile virus cases in California, 2005, by week of onset (n=756)\* (Reported as of November 29, 2005)



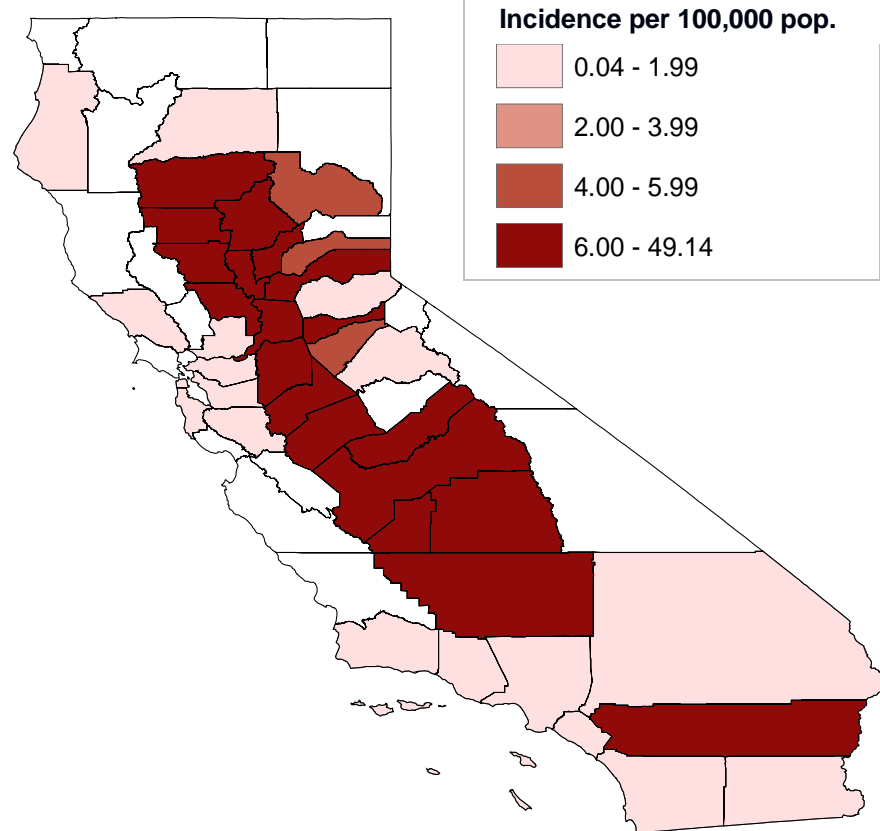
\* Onset dates not available for 97 cases.

# Reported incidence of human WNV illness, by county California, 2004-2005



**2004**

Statewide incidence = 2.30 per 100,000 pop.



**2005 (as of 11/29/05)**

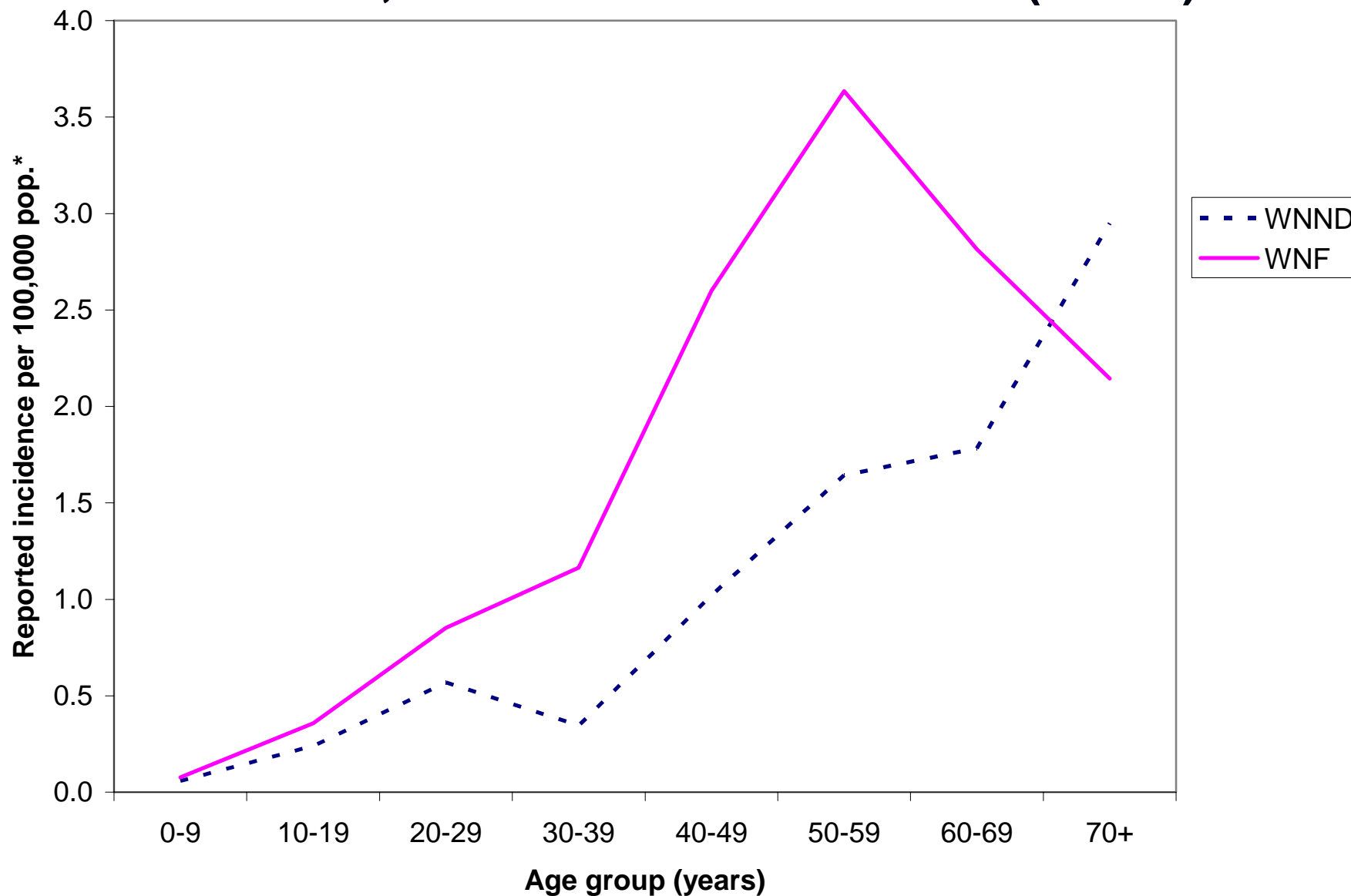
Statewide incidence = 2.52 per 100,000 pop.

# Human WNV activity, 2004-2005

	2004	2005*
Total human infections	830	910
Total symptomatic cases	779	854
Incidence per 100,000 pop.	2.30	2.52
Neuroinvasive disease	289	285
West Nile fever	395	501
Median age, all cases	52 yrs	50 yrs
Median age, neuroinvasive	57.5 yrs	56 yrs
Total WNV-related fatalities	28	18

\* Reported as of November 29, 2005

# Incidence of WNV illness, by age and clinical presentation California, 2005 – as of November 29 (n=785)



\* 2000 U.S. Census Data

# Risk factors for WNND

- Age is a risk factor for WNND ( $p < 0.001$ )
- In 2004, observed high frequency of hypertension and diabetes in fatalities, neuroinvasive cases
- 2005 WNV case history form asks about HTN, DM
- Preliminary data, 2005 cases
  - HTN ( $p = 0.012$ ) and DM ( $p < 0.001$ ) are risk factors for WNND for all cases
  - For cases  $\geq 45$  years, DM remains a significant risk factor, but HTN does not
  - Little information available on Type I vs. Type II, controlled vs. uncontrolled DM



# 2004 WNV-associated fatalities

- Reviewed WNV case history forms, extended clinical and laboratory information, discharge summaries, and death certificates
- 28 fatalities from 7 counties
  - Illness onset June 19 - October 15, 2004
  - Deaths occurred June 24, 2004 - March 19, 2005
  - Median age in years = 75 (range: 25-94)
  - 18 (64%) male
  - 19 (68%) White, 7 (25%) Hispanic

# 2004 WNV-associated fatalities

- Median interval between hospitalization and death in days = 14 (range: 1-172)
- Underlying chronic conditions
  - Hypertension (n=19, 68%)
  - Diabetes mellitus (n=12, 43%)
  - Immunocompromised status (n=2, 7%)
- WNV often not considered on admission (e.g. pneumonia, bronchitis)
- Death certificates did not always list WNV as cause or contributing factor

# 2005 WNV-associated fatalities

As of November 29, 2005:

- 18 fatalities reported from 11 counties
- Median age in years = 79 (range: 62-92)
- 14 (78%) male
- Of 9 decedents where data is available, median interval in days between hospitalization and death = 10 days (range: 4-31)

# Acute flaccid paralysis

- In 2004, 21 (3%) cases had acute flaccid paralysis, per case history form
  - Median age in years = 61 (range: 12-91)
- As of November 29, 2005, 35 (4%) cases with acute flaccid paralysis
  - Median age in years = 55 (range: 13-84)
  - 18 with encephalitis and/or meningoencephalitis
  - 7 with meningitis
  - 2 fatalities

# Pediatric cases in CA, 2004

- In 2004, 440 (22%) individuals tested for WNV at VRDL were  $\leq 18$  years
- 33 (4%) of the 779 WNV cases  $\leq 18$  years
  - 18 (55%) West Nile fever
  - 14 (42%) West Nile neuroinvasive disease
  - 1 case clinical presentation unknown
  - Median age in years = 11 (range: 2-18)
  - 27 (81%) male
  - **No fatalities**

# Pediatric cases in CA, 2004

Pediatric WNV Cases in California, 2004  
N=33 (23 cases reviewed)

## West Nile Fever

- 12 cases
- Median age = 13 yrs
- None hospitalized

## West Nile Neuroinvasive

- 11 cases

### Meningitis

- 6 cases
- Median age = 12 yrs
- 5 cases hospitalized
- Length of stay 3-5 days

### Encephalitis

- 5 cases
- Median age = 15 yrs
- All cases hospitalized
- Length of stay 5-71 days
- 2 cases with AFP

# Pediatric cases in CA, 2005

- In 2005, ~500 (23%) individuals tested for WNV at VRDL have been  $\leq 18$  years
- 35 (4%) of the 854 WNV cases  $\leq 18$  years
  - 21 (60%) West Nile fever
  - 13 (37%) West Nile neuroinvasive disease
  - 1 case with unknown clinical presentation
  - Median age in years = 16 (range: 2-18)
  - 21 (60%) male
  - **No fatalities**

# WNV Outcome Studies

- WNV encephalitis case follow-up, 2004 (2005 in progress)
  - 3, 6, and 12 month follow-up surveys
  - For activities of daily living, e.g. eating and walking, most returned to baseline by 3 months
  - However, many neuropsychological outcomes worsened over time, e.g. depression, word finding and memory
  - Currently investigating cases that were lost to follow-up
  - Contact: Shilpa Gavali [SGavali@dhs.ca.gov](mailto:SGavali@dhs.ca.gov)
- WNV fever case follow-up
  - Contacts: Anne Kjemtrup [AKjemtru@dhs.ca.gov](mailto:AKjemtru@dhs.ca.gov); or Jamie Riggs-Nagy [JRiggs@dhs.ca.gov](mailto:JRiggs@dhs.ca.gov)



# Initial conclusions

- Diabetes appears to be a risk factor for neuroinvasive disease
- Mortality greatest amongst elderly population (consistent with national surveillance data)
- Acute flaccid paralysis can affect all age groups
- Relatively reassuring news for pediatric population

# **Issues and Challenges in 2005**

# 2005 updates

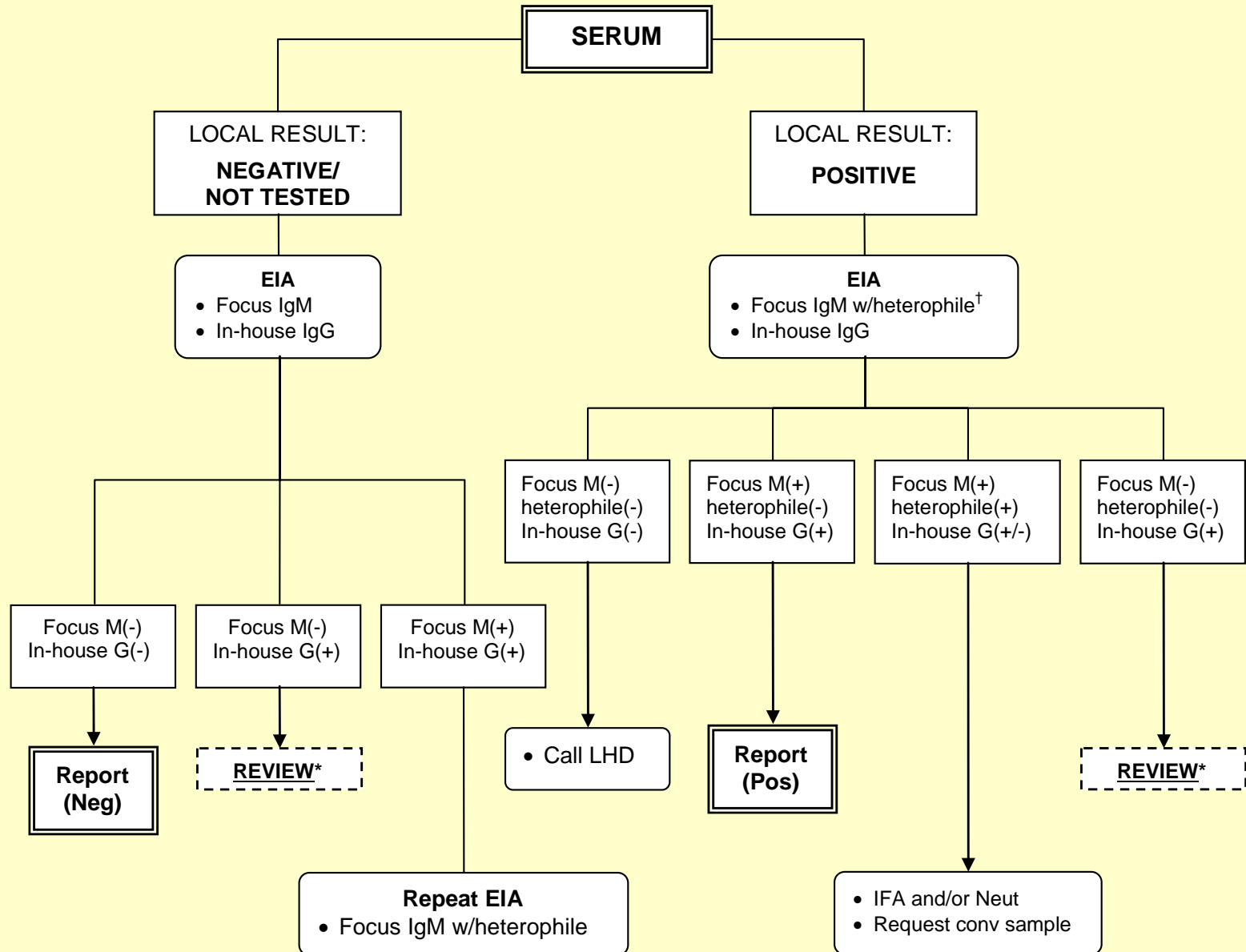
- WNV became reportable by providers and laboratories
- Completed case history form no longer required for testing at State virus lab (VRDL)
- Case history form updated and disseminated to counties, posted to CD forms website
- VRDL stopped requesting that commercial labs submit all IgM-positive specimens to VRDL for repeat/confirmatory testing
- Guidelines developed for use within regional public health laboratory network

# Case classification

Within the regional public health laboratory network, a person was considered a WNV case if he or she had a clinically compatible illness and the following lab results:

- IgM(+) by two different assays; or
- IgM(+) and IgG(+) by EIA; or
- IgM(+) and IgG(+) by IFA; or
- Rising IgG antibodies

# VRDL WNV Testing Algorithm



# Making the diagnosis...

- IgG(+) only
  - In general considered to be old infection
  - Follow-up specimens requested if WNV still clinically suspected, particularly if initial specimen was collected early, or if patient was a child with no travel history
- IgM(+) only, by one assay
  - Possibility of false IgM(+) result
  - Heterophile subtract procedure can only be done on serum
- Correct diagnosis especially important for neuroinvasive disease cases

# Old WNV infection?

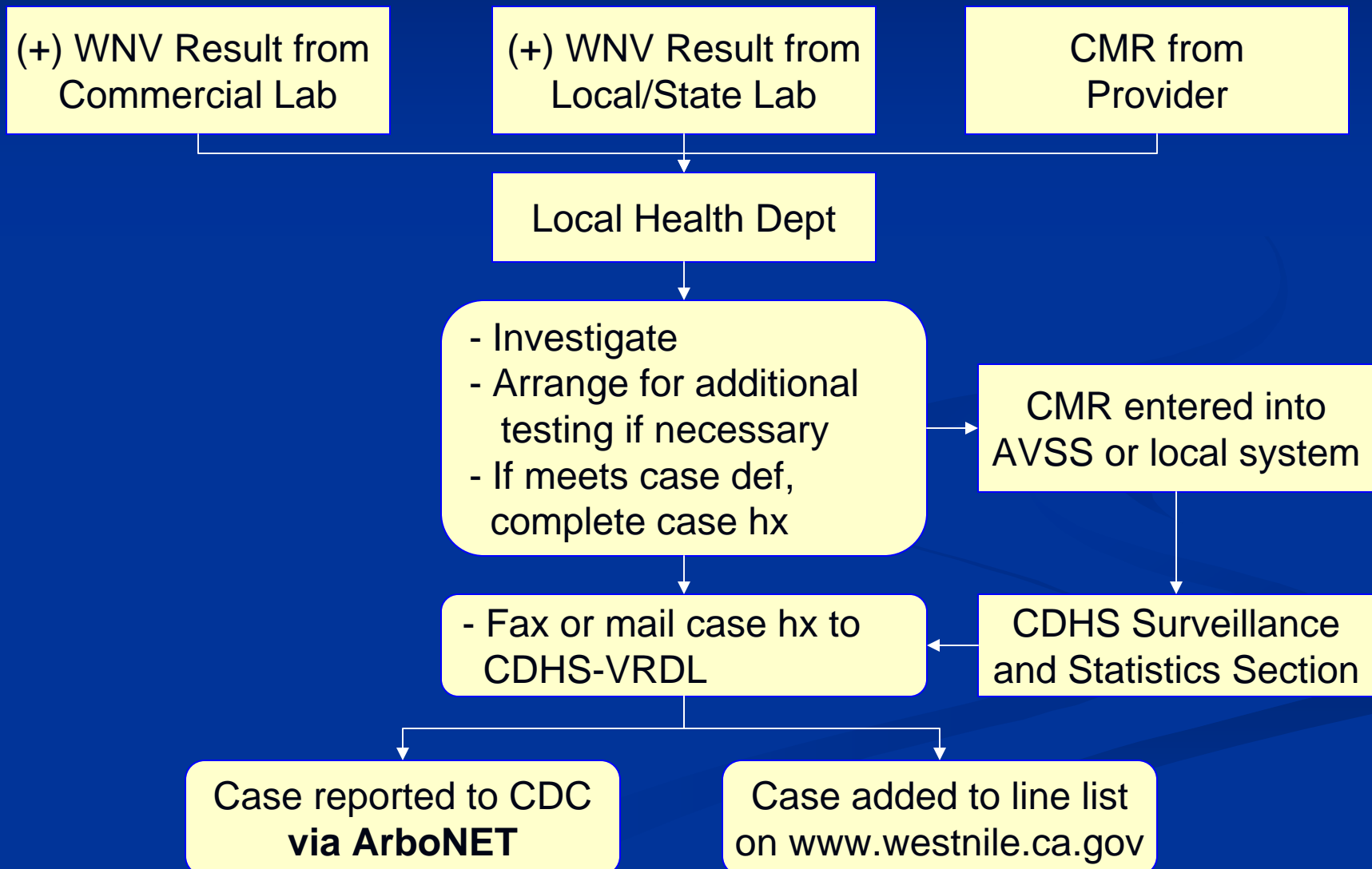
- Suspect WNV cases detected early in the 2005 season were approached with caution
  - Possible lingering IgM from a 2004 infection
- In addition to clinical, travel, and exposure history, checked for:
  - Non-human surveillance activity
  - Rise in antibodies with follow-up serum
  - Avidity test results (experimental- not reported)

# Infections vs. Cases

- California WNV website summary lists total number of human WNV infections
  - This includes asymptomatic infections, e.g. blood donors
- A “case” must also have clinical illness
  - CDC website lists the number of cases
- Media does not always make this distinction
- In 2005, tried to keep better track of infection vs. case breakdown



# Reporting WNV infections



# WNV reporting issues

- Updated state line list twice a week, on Tuesdays and Fridays
- When reporting positive lab results from VRDL, waited for local health department's confirmation before adding to line list

# What worked in 2005

- Routine communication between state and local health departments and other agencies via teleconferences, email updates, etc.
- Expanded WNV testing at local public health laboratories
- Improved accuracy and timeliness of reporting
- Continued collaboration with commercial laboratories, Kaiser, blood banks

# 2006 and beyond...

- Maintain network between state, local public health departments and labs, vector control agencies, Kaiser, etc.
- Continue to work with commercial labs on timely reporting of WNV results to local health departments
- Further streamline reporting process
- Use feedback/lessons learned from 2005 to improve human WNV testing and surveillance
  - Send comments to Cynthia Jean [CJean@dhs.ca.gov](mailto:CJean@dhs.ca.gov) or Carol Glaser [CGlaser@dhs.ca.gov](mailto:CGlaser@dhs.ca.gov)